

CLAIMS

1. A method of installing a self-attaching female fastener element in a metal panel, said self-attaching female fastener element including a body portion having a bore therethrough, a first tubular barrel portion integral with a first end of
5 said body portion and a second tubular barrel portion integral with a second end of said body portion, each of said tubular barrel portions having a longitudinal axis coincident with a longitudinal axis of said bore and an outer diameter less than said body portion, such that said self-attaching female fastener element is symmetrical with respect to a plane perpendicular to said longitudinal axis, said method
10 comprising the following steps:
- inserting a distal open end of one of said first and second tubular barrel portions through an opening in said panel and substantially simultaneously
- deforming said one of said first and second tubular barrel portions radially outwardly and inwardly to entrap an end portion of said panel surrounding
15 said opening, permanently retaining said self-attaching female fastener to said panel;
and
- deforming the other of said first and second tubular barrel portions radially outwardly and inwardly, thereby reducing the longitudinal length of said self-attaching female fastener installed in said panel.

20

2. The method of installing a self-attaching female fastener element as defined in Claim 1, wherein said body portion includes a generally polygonal outer surface, said method including driving said body portion into said panel, deforming a tubular panel portion adjacent said end portion against said generally polygonal outer surface of said body portion, thereby preventing rotation of said self-attaching female fastener relative to said panel.

3. The method of installing a self-attaching female fastener element as defined in Claim 1, wherein said method includes driving said distal open end of said one of said first and second tubular barrel portions against said panel, and piercing said opening in said panel.

4. The method of installing a self-attaching female fastener element as defined in Claim 1, wherein said method includes deforming said other of said first and second tubular barrel portions radially outwardly and inwardly by folding an outer tubular distal barrel portion over an inner tubular barrel portion having a distal end adjacent said body portion.

5. The method of installing a self-attaching female fastener element as defined in Claim 4, wherein said method includes deforming said inner tubular barrel portion at an acute angle relative to an axis of said bore and folding said outer tubular distal barrel portion generally parallel to said inner tubular barrel portion.

6. A method of installing a self-attaching female fastener element in a metal panel, said self-attaching female fastener including a body portion having a threaded bore therethrough, and tubular barrel portions integral with opposed ends of said body portion, each of said tubular barrel portions having an outer diameter less
 5 than an outer diameter of said body portion, a longitudinal axis coincident with a longitudinal axis of said threaded bore, an open distal end and an equal longitudinal length, such that said self-attaching fastener element is symmetrical with respect to a plane perpendicular to said longitudinal axis, said method comprising the following steps:

10 driving a first of said distal open ends of either of said tubular barrel portions against said panel and piercing an opening in said panel, and driving said first of said distal open ends through said panel openings, and substantially simultaneously

driving said body portion against said panel surrounding said opening,
 15 deforming said panel into a tubular portion having an open distal end;

deforming said first of said distal open ends radially outwardly and inwardly to entrap said open distal end of said tubular portion of said panel, permanently retaining said self-attaching female fastener element to said panel; and

deforming a second of said distal open ends of an other of said tubular
 20 barrel portions radially outwardly and inwardly to reduce the longitudinal length of said female fastener element installed in said panel.

7. The method of installing a self-attaching female fastener element as defined in Claim 4, wherein said body portion includes a generally polygonal outer surface, said method including deforming said tubular portion of said panel radially inwardly against said generally polygonal outer surface of said body portion, thereby
5 preventing rotation of said self-attaching female fastener element relative to said panel.

8. The method of installing a self-attaching female fastener element as defined in Claim 6, wherein said method includes deforming said other of said tubular barrel portions radially outwardly and inwardly by folding an outer tubular distal
10 barrel portion over an inner tubular barrel portion generally parallel thereto with said distal open end adjacent said body portion.

9. The method of installing a self-attaching female fastener element as defined in Claim 8, wherein said method includes deforming said inner tubular barrel portion at an acute angle relative to an axis of said threaded bore.

10. A method of installing a self-attaching female fastener element in a metal panel, said female fastener element including a body portion having a bore therethrough, a first tubular barrel portion integral with a first end of said body portion and a second tubular barrel portion integral with a second end of said body
5 portion, each of said tubular barrel portions having a longitudinal axis coincident with a longitudinal axis of said bore, an outer diameter less than said body portion and an equal longitudinal length, such that said self-attaching fastener element is symmetrical with respect to a plane perpendicular to said longitudinal axis, said method comprising the following steps:

10 inserting a distal end of one of said first and second tubular barrel portions through an opening in said panel and substantially simultaneously

deforming said one of said first and second tubular barrel portions radially outwardly and inwardly to entrap an end portion of said panel surrounding said opening, permanently retaining said self-attaching female fastener to said panel;

15 and

deforming and folding said other of said first and second tubular barrel portions radially outwardly and inwardly, forming a first inner tubular barrel portion extending at an acute angle relative to a longitudinal axis of said bore and an outer distal tubular barrel portion extending generally parallel to said first inner tubular
20 barrel portion having a distal end adjacent said body portion.

11. The method of installing a self-attaching female fastener element as defined in Claim 10, wherein said method includes driving said body portion into said panel surrounding said opening in said panel deforming a tubular panel portion having an open distal end and deforming said one of said first and second tubular barrel portions radially outwardly and inwardly to entrap said open distal end of said tubular panel portion.

12. A self-attaching female fastener element, comprising: a body portion having first and second ends, a bore through said body portion through said first and second ends, a first tubular barrel portion integral with said first end of said body portion coaxially aligned with said bore, and a second tubular barrel portion integral with said second end of said body portion coaxially aligned with said bore, each of said tubular barrel portions having an outer diameter less than a major diameter of said body portion and smooth cylindrical inner and outer surfaces, and said tubular barrel portions having an equal longitudinal length, such that said self-attaching female fastener element is symmetrical with respect to a plane perpendicular to a longitudinal axis of said bore.

13. The self-attaching female fastener as defined in Claim 12, wherein each of said first and second tubular barrel portions include an open distal end having a chamfer extending radially outwardly from said inner surface.

14. The self-attaching female fastener as defined in Claim 12, wherein the internal diameter of said smooth cylindrical inner surface of said first and second tubular barrel portions is greater than an internal diameter of said bore.